

SECTION 09861. ANTI-GRAFFITI COATINGS

PART 1- GENERAL

1.1 DESCRIPTION

- A. This Section provides a technical strategy for installation of specified anti-graffiti (AG) coatings on exposed structural substrates on fixed property and in rights-of way under the purview of MBTA.
- B. The basic technical concept involves installing protective coatings to prevent permanent marking of surfaces via convenient removal of graffiti markings on a repeated basis. Coatings with non-wetting or other physico-chemically properties that discourage graffiti marking may warrant preferred selection.
- C. Affected substrates include:
- Bare and painted concrete, concrete block and brick masonry.
 - Ceramic tiles, mosaic tiles, painted plaster and painted stucco.
 - Bare, painted and vinyl-coated aluminum (mostly signage), bare stainless steel, bare and painted sheet metal, including galvanized sheet.
 - Clear, tinted and painted plastic panes and panels, including acrylic (e.g., Plexiglass), polycarbonate (e.g., Lexan) and fiberglass-reinforced plastic (FRP) sheet.
 - Bullet-proof and other glass.
- D. At the discretion of the MBTA Engineer, the anti-graffiti coating shall be a clear material that does not significantly alter the appearance of the substrate.

1.2 DESIGN GUIDANCE

A. Surface texture:

Surface cleanability depends on roughness and porosity. Architectural surface textures range from super-smooth glaze finishes on tiles and glass to coarsely fractured concrete block. Porosity of the surfaces also ranges from zero for glass and metal to significant for concrete and masonry.

Rough surfaces should get an AG coating that permanently seals surface porosity. Conversely, smooth surfaces may need to be roughened/profiled in a controlled manner in order for the AG coating to bond adequately to the surface.

B. Recoating:

The number of times a coated surface can be cleaned before it is recoated depends on the coating durability and the cleaning procedure. Cleaning procedures should follow the coating manufacturer's instructions unless these are superseded by specific MBTA Engineer's instructions for that specific AG coated surface.

Coatings for specific surfaces should be selected with an approximate expected number of cleaning cycles to recoat in mind, depending on such factors as work location and accessibility, surface preparation requirements for recoating, and other coating application considerations, including compatibility and adhesion between the old and new AG coatings.

C. New construction:

Anti-graffiti measures should be an architectural design consideration in selecting materials and surface textures. At a minimum, graffiti-susceptible surfaces should be amenable to sealing with a clear or pigmented AG coating, or incorporate other anti-graffiti measures approved by the MBTA Engineer.

1.3 CERTIFICATION AND REGULATIONS

A. Contractor certification:

Contractors installing anti-graffiti coatings shall be certified in writing by the manufacturer as a trained installer of the specified coating materials.

B. Handling, storing, disposal, and installation of coating materials and solvents: Contractor is responsible for fully meeting health, occupational safety and environmental requirements of all applicable local, state, or federal codes, regulations, and ordinances. Contractor shall ascertain what local, state and federal codes, regulations, and ordinances are in effect.

C. To ensure full product compatibility, primary materials for each coating system installed in accordance with this Section shall be sourced from a single manufacturer. Secondary materials and solvents from other sources shall be approved by the coating system manufacturer.

D. Coating materials shall meet Federal and State requirements for Volatile Organic Compound (VOC) content.

1.4 SUBMITTALS

A. Product Data Sheets:

Coating manufacturer's product data sheets, including installation instructions and service limitations for each material used shall be submitted to the MBTA Project Engineer.

B. Certified test reports shall be provided for all specified coating performance test claims.

C. Performance test reports:

Submit evidence the AG coating has successfully performed or been field-tested for AG purposes for a minimum of six months. Longer performance and testing shall work in the coating's favor. Descriptions of test conditions and performance criteria shall be sufficiently detailed for results to be comparatively evaluated by the MBTA Engineer and for testing to be repeated by others.

1.5 PRODUCT STORAGE, HANDLING AND DISPOSAL

A. Deliver materials and products in sealed, factory-labeled containers.

- B. Store the materials in a safe place that cannot be accessed by unauthorized people.
- C. Store, handle and prepare all coating materials under cover and protect from weather damage, strictly complying with the product manufacturer's directions and temperature limits.
- D. Collected, package and dispose of spoiled, unused and waste materials and product debris in total compliance with MBTA rules for chemical and solvent disposal.

1.6 INSTALLATION WORK RESTRICTIONS

- A. Weather:
Perform anti-graffiti coating installation work, including surface preparation and curing, only when ambient weather conditions definitely will remain within temperature and humidity limits specified by the coating manufacturer.
- B. Temperature:
 - 1. Unless otherwise approved by the product manufacturer, apply the coating materials only when substrate surface and ambient temperatures are between 50°F - 85°F and will not be out of this range during the entire work period.
 - 2. Unless otherwise approved by the product manufacturer, store base materials and mixed products between 60°F and 80°F during application.
 - 3. Do not apply materials that are hotter than permitted by the product manufacturer.
- C. Schedule coating installation work to avoid interference between construction work, surface preparation and to minimize exposure of pedestrian and auto traffic.
- D. Spills and overspray:
 - 1. Deliberately avoid overspray on nearby surfaces and public property.
 - 2. Divert and protect pedestrian and auto traffic that could be affected by inhalation and overspray exposure during coating preparation and installation. Remove misapplied material, spills and overspray immediately.
- E. Personnel safety:
 - 1. Contractor employees installing the coating shall fully comply with all applicable personnel safety and health rules and procedures (see 1.02 B) and with the coating manufacturer's health and safety directions and recommendations.
 - 2. Do not use flammable products near fire or extreme heat.
 - 3. Always work in adequately ventilated conditions. Applicators shall wear NIOSH/MSHA approved respirators, eye protection, and protective clothing. Read material safety data sheets for additional toxicity and product hazard information.
 - 4. The public and all people not employed by the Contractor and MBTA shall be adequately protected from inhalation and overspray exposure to the coating materials.

PART 2 - MATERIALS

2.1 COATINGS

- A. Anti-graffiti (AG) coatings suitable for repeated cleaning are of two generic types:
 - 1. High gloss, low-build, two-component, aliphatic polyurethane coatings, available in clear and pigmented versions. (May use fluoro-polymer chemistry to enhance anti-graffiti performance.)
 - 2. Organo-silicate coatings based on silane/siloxane chemistry, available in clear and pigmented versions. (Fluoro-polymer chemistry may be incorporated to enhance anti-graffiti performance.)
- B. Products with adequate film hardness and gloss-retention for AG service include, in alphabetical order:
 - 1. *Polyurethane type:*
 - Carboline Carbothane® 133HB (satin finish) - low VOC version.
 - Carboline Carbothane® Clear coat AG (gloss and satin finish)
 - DuPont Imron® 2.8 HG pigmented paint (HG indicates high gloss)
 - DuPont Imron® 3.4 HG-C clear coat
 - 2. *Organo-silicate type:*
 - Ameron PSX 700 pigmented
 - Ameron PSX 700 clear
 - Carboline Carboxane® 2000 pigmented (gloss and satin finish)
 - Carboline Carboxane® 2000 clear (gloss and satin finish)

2.2 CLEANING SOLUTIONS

- A. Cleaning solutions shall be as approved or recommended by the AG coating manufacturer to maximize cleaning effect without harming the AG coating.
- B. Cleaning solutions and procedures shall not damage the substrate beneath the AG coating except where this is approved by the MBTA Engineer (e.g., because the substrate will be newly coated.)
- C. Cleaning solutions shall meet MBTA requirements for personnel exposure, safe handling and disposal.

PART 3 - EXECUTION

3.1 WORK AREA SUBSTRATE INSPECTION

- A. Examine substrates and identify conditions that could impede successful and smooth execution of the work. Factors to consider:
 - o Type of surface, including texture and porosity - influences surface preparation and coating system selection.
 - o Time windows and worker access for required sequence of surface preparation, coating installation (number of coats); curing.

- o Potential effects of changes in ambient conditions in the work area and dryness of the substrate.
- o Health and safety protection requirements for Contractor and public.

Do not start work until job conditions are satisfactory to complete all required tasks in the available time.

3.2 COATING SELECTION

A. Protected substrates shall be adequately sealed and non-porous before the anti-graffiti coating is applied.

B. To select the right anti-graffiti product, the MBTA Engineer shall adequately weigh the following criteria:

- o Selection for simpler application with fewer chemical exposure concerns from solvents favors organo-silicate types.
- o Selection for superior adhesion to non-blasted glass, plastic, previously painted and less than ideal substrates favors polyurethane types.
- o Selection for higher hardness to resist repeat cleaning performance favors organo-silicate types.
- o Selection for longer gloss retention in UV exposure favors polyurethane types.
- o Highest anti-graffiti performance is obtained by applying an additional, clear polyurethane seal coat.

C. In general, clear coating shall be used to preserve architectural/aesthetic surface appearance, as directed by the MBTA Engineer.

3.3 APPLICATION

A. General Application procedures:

Strictly follow the coating manufacturer's surface preparation, application and curing instructions, unless more restrictive requirements are specified in this Section. The coating manufacturer's limits for thinning, additives, pot-life, wet film thickness per coat and recoat time shall be known and carefully followed.

B. Masking and overspray protection:

Protect contingent surfaces that should not be coated, oversprayed or contacted by cleaning or coating chemicals. Normally this is done with strippable masking materials, plastic sheeting and waterproof tape, or masking materials barriers approved by the MBTA Engineer.

C. Surface Preparation:

The substrate shall be flat and smooth enough to be thoroughly prepared and for the coating material to be evenly applied everywhere. NOTE: Coarsely profiled substrates like fractured concrete block require extra measures to benefits from anti-graffiti coatings.

1. Cavities and protuberances that can cause shadowing shall be filled or removed. Substrate roughness shall allow the method of application (brush, roller or spray) to provide uniform film thickness everywhere.
2. Materials used to clean, patch, caulk and fill the substrate shall be approved by the coating manufacturer. Compatibility of existing materials shall be

patch-tested before the coating is applied or painted with a primer or tie-coat from the coating manufacturer.

3. The surface shall be thoroughly cleaned, dust-free, with no dirt, loose material, oil, water and other residues or contaminants.
4. Masonry, tile and concrete surfaces shall be power-washed with high pressure water and appropriate chemical additives to remove surface contamination.
5. Visible moisture is not permitted. Dampness shall not exceed the coating manufacturer's limits.
6. Existing coatings must be tightly adhered and proven by test to be unaffected by the new coating.

D. Sample preparation:

At the MBTA Engineer's discretion, the Contractor shall provide portable, finished samples of the final product on the target substrate(s) that are prepared in the specified manner. The resulting samples shall be used for comparative acceptance of actual work at the MBTA Engineer's discretion.

3.4 FIELD QUALITY CONTROL

- A. The Contractor shall establish and maintain throughout the work of this Section effective quality control measures described in a written scheme to ensure that all coating related work is performed as required by the Contract Documents.
- B. Quality-related test and inspection procedures, acceptance criteria and test reporting requirements for all phases of coating installation shall be defined by the MBTA Engineer before the work commences.

PART 4 - GRAFFITI REMOVAL

- A. Main objectives in removing graffiti from surfaces protected with AG coatings installed as described in this Section shall be to use experience and engineering judgment of all parties - MBTA, Contractor and AG coating manufacturer to:
 - o Minimize the physical and chemical harshness of the cleaning procedure so as to minimize environmental and health effects and preserve as much of the AG coating as practical during the cleaning operation.
 - o Clean with water, including hydro-blasting up to 5,000psi, wherever possible. Increase the solvent power of water by adding low concentrations of detergent or non-toxic emulsifier, such as tri-sodium phosphate (TSP), sodium carbonate (soda ash) or approved proprietary cleaning surfactants.
 - o Use only commercial organic solvent cleaners specified by the AG coating manufacturer for their specific coatings. These must contain non-toxic, biodegradable chemicals that do not require special containment and disposal.
- B. Use an escalating scale of more aggressive cleaning procedures on a systematic basis, using test cleaning to select the cleaning procedure.
- C. Carefully follow recoat time limits if new AG coating material is applied to surfaces freshly cleaned with solvent cleaners.
- D. Keep a complete log of cleaning events and procedures used to remove graffiti on every project doing work in accordance with this Section.

NOTES TO THE DESIGNER

- A. Any request to modify or waive the specification requirements listed below must be approved in writing from the MBTA Project Manager:
 - 1. Products listed in Part 2.01 B of Section 09861